



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. patent application of:)
Oleg Wasynczuk, et al.) Before the Examiner
Serial No. 09/884,528) Ayal I. Sharon
Filed June 19, 2001) Group Art Unit 2123
DISTRIBUTED SIMULATION)

DECLARATION OF DR. PAUL C. KRAUSE

1. My name is Dr. Paul C. Krause. I founded P.C. Krause and Associates, Inc. (hereinafter "PCKA") in 1983 and serve as President of the corporation. Since 1970, I have also held the position of Professor with the School of Electrical and Computer Engineering at Purdue University.

2. As president of PCKA, I oversee and have knowledge of all of the activities of the several employees of PCKA, including the sales and marketing of PCKA products and services.

3. PCKA has its headquarters in West Lafayette, Indiana and specializes in the analysis, design, and simulation of power systems and power system components, with particular emphasis on terrestrial power systems and power-electronic-based systems being used in or designed for ships, ground vehicles, aircraft, and spacecraft. In 2003, PCKA expanded its operations and opened a new office in Beavercreek, OH. Located just minutes from Wright-Patterson Air Force Base, this office supports numerous Air Force programs and research initiatives.

4. PCKA is the sole developer and provider of the Distributed Heterogenous Simulation (DHS) software under the present patent application.

5. The DHS software sold by PCKA includes the following features:

a first executing process that: a) implements a first continuous-time model to simulate a first subsystem, the first model being programmed in a first language and having a first state variable; and b) sends a first series of state-related numerical values, each numerical value reflecting information relating to the value of the first state variable at a different point t_m in simulation time in the first model; and

a second executing process that: a) receives said first series of state-related numerical values from said first executing process without said first series of state-related numerical values passing through a central communication process; b) implements a second continuous-time model to simulate a second subsystem, the second model being programmed in a second language and taking as an input values from said first series of state-related numerical values; and c) outputs data representative of a state of the second continuous-time model.

6. PCKA has received funding from numerous U.S. government agencies including the Air Force Research Lab (AFRL), United States Army, United States Marine Corps Systems Command, Missile Defense Agency (MDA), National Aeronautics and Space Administration (NASA), Naval Sea Systems Command (NAVSEA), Naval Surface Warfare Center (NSWC), Office of Naval Research (ONR), Tank-automotive and Armaments Command (TACOM), United States Naval Academy and United States Naval Postgraduate School, as well as several private companies.

7. To date, the PCKA DHS product has been purchased and/or adopted by many large and technologically sophisticated companies, including General Electric (Global Research, Aircraft Engines, Power Systems), Boeing Commercial Aircraft (for use on the 787 program), Northrup Grumman Corporation, Rolls Royce Corporation, Smiths Aerospace, and General Dynamics.

8. Typical purchase orders for the PCKA DHS product are \$20,000 to \$40,000, depending upon the selected options.

9. As an example, attached as Exhibit B is a purchase order from Boeing Shared Services Group for the PCKA DHS product in the amount of \$38,000.

10. As a further example, attached as Exhibit C are two purchase orders from GE Global Research for the PCKA DHS product in the aggregate amount of \$32,000.

11. As is well known, these are very large, extremely technically sophisticated companies that purchase research tools based upon their technical merit and not based upon advertising and marketing programs.

12. Such commercial success of the PCKA DHS product is evidence that the DHS product is not obvious in view of the prior art, as these companies could have simply used prior art techniques for simulation rather than purchase the DHS product from PCKA.

13. The PCKA DHS product was used by researchers at Northrup Grumman and the Air Force Research Laboratory to model and study the electrical-power system of the U.S. Air Force's high-altitude long-endurance (HALE) unmanned aerial vehicle (UAV). These researchers (in consultation with PCKA employees) authored a technical paper describing the simulation and the PCKA DHS product that was published in the November 2004 issue of *Aerospace Engineering*, published by the Society of Automotive Engineers/SAE Aerospace. The article describes the nearly 21-fold speed increase when using the DHS product simulation incorporating three computers as opposed to a single computer simulation. This article is attached hereto as Exhibit D.

14. The adoption and use of the PCKA DHS product by sophisticated users such as Northrup Grumman and the Air Force Research Laboratory, as well as the publication of a

description of the DHS simulation product (described as “new” and resulting in “significant improvements” in processing speed over prior techniques) in a prestigious technical journal such as *Aerospace Engineering*, is evidence of the non-obvious nature of the DHS product in view of the prior art.

15. The PCKA DHS product was also featured in the December 2005 issue of the Air Force Research Laboratory’s *Technology Horizons* magazine (attached hereto as Exhibit E). The article discusses the simulation speed increase allowed by the DHS product from 117,800 seconds of simulation time for each second of real time to only 120 seconds of simulation time for the same one second of real time using the DHS product on four inexpensive personal computers (a 981-fold speed increase).

16. Again, the adoption and use of the PCKA DHS product by a sophisticated user such as the Air Force Research Laboratory, as well as the publication of a description of the DHS simulation product (described as “substantially increases simulation speeds” and “markedly reduces engineering design costs” and “supports the integration of propulsion, power, thermal avionics, sensor and directed energy weapon subsystems at a level of detail not before possible” (emphasis added)) in the Air Force Research Laboratory’s own technical journal, is evidence of the non-obvious nature of the DHS product in view of the prior art.

17. Of particular significance, the U.S. Air Force has awarded PCKA a \$49 million IDIQ SBIR Phase III contract to support the commercialization of the DHS product. Furthermore, the Air Force has invested several million dollars in fundamental research that makes use of the DHS product to perform higher-level research objectives.

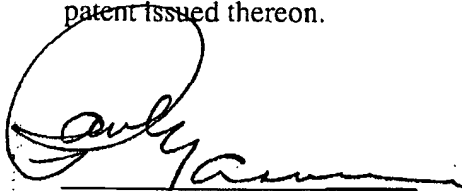
18. The U.S. Air Force’s enormous financial investment in the PCKA DHS product is further evidence of its non-obviousness in view of the prior art. This is particularly true in view

of the fact that the Air Force is an extremely sophisticated consumer and user of such simulation tools.

19. Based on my over twenty years of experience in the field of complex systems simulation and my knowledge of PCKA's competitors and their products, I believe that PCKA's competitors would copy the simulation methodologies described in the patent application if they knew that it was not protected by a patent or pending patent rights.

20. The covered simulation products have enjoyed exceptional commercial success, are believed to be at risk of copying by competitors, and solve problems inherent in all prior art simulation systems that were not able to be solved by the industry. This is evidenced by the large investment in and purchase of the DHS product by the world's most sophisticated users of system simulation software.

21. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Dr. Paul C. Krause

1/17/06
Date

Deliver this PO to:

MR. LUCAS



Purchase Order

Bill To:

Software House International
2 Riverview Drive
Attn: Accounts Payable
Somerset, NJ 08873

Vendor:

P C KRAUSE AND ASSOCIATES

MR. LUCAS

Phone: (765)464-8997

Fax: (765)464-1017

Email:

Purchase Order Number:

YN9RL

Ship To:

BOEING SHARED SERVICES GROUP
8002 S. 212TH ST
WA 7-482.1 DCK, DOOR 4

PO# 3418461

KENT

WA 98032

US

REQ. SHIP DATE	BUYER	SHIP VIA	CURRENCY	TERMS
06/22/2005	Armanda Hoffman	UPS GROUND	US DOLLAR	NET 30

QTY	MFG PART #	DESCRIPTION	UNIT PRICE	TOTAL
1	NONE	DISTRIBUTED HETEROGENEOUS SIMULATION S/W/FULL PACKAGE/SHRINKW Version: 0.0 WINDOWS 98/2000/NT/ME/XP CDROM MFR: PC KRAUSE AND ASSOCIATES Language: ENGLISH, US End User Name: LINDA DANIELS End User Phone: 4252663725 End User Email: LINDA.S.DANIELS@BOEING.COM	10,000.00	10,000.00
1	NONE	DISTRIBUTED HETEROGENEOUS SIMULATION S/W/FULL PACKAGE/SHRINKW Version: 0.0 WINDOWS 98/2000/NT/ME/XP CDROM MFR: PC KRAUSE AND ASSOCIATES Language: ENGLISH, US End User Name: LINDA DANIELS End User Phone: 4252663725 End User Email: LINDA.S.DANIELS@BOEING.COM	10,000.00	10,000.00
1	NONE	DISTRIBUTED HETEROGENEOUS SIMULATION S/W/FULL PACKAGE/SHRINKW Version: 0.0 WINDOWS 98/2000/NT/ME/XP CDROM MFR: PC KRAUSE AND ASSOCIATES Language: ENGLISH, US End User Name: LINDA DANIELS End User Phone: 4252663725 End User Email: LINDA.S.DANIELS@BOEING.COM	18,000.00	18,000.00

Order Specific Instructions:

PLEASE REFERENCE QUOTE #: 042105-1B THANKS

PO # YN9RL

received
6-22-05 CDS

Page 1 of 2

General Instructions:

1. If you receive multiple faxes for the same PO number, please do NOT process.
2. Do not include any pricing information in package.
3. Notify us immediately if you are unable to ship as specified.
4. Reference Our Purchase Order # on all invoices to Software House.
5. Ok to add Shipping and/or handling charges to invoice.
6. Software House Int'l is tax exempt. NJ Tax Exempt# 22-3009648

Important:

Please fill in the following information & fax back this sheet.

Your confirmation #

PCKA/SHI-002

Expected ship date

June 30, 2005

Approx. Shipping Cost

0

PO #YN9RL

Thank You!!

Subtotal: 38,000.00

Freight: See Instructions

Tax: See Instructions

Total: 38,000.00

Authorized by: Amanda Hoffman

Phone: (732) 868-8988 Fax: 732-302-9730

Email: amanda_hoffman@shi.com

Check deposited 8/18/05

INVOICE#	INV. DATE	PAY AMOUNT	DISC	TAKEN	DATE	CHECK NO.	VENDOR KEY
2PCKASHI	06/23/05	38000.00		0.00	08/08/05	230848	49223
						VOUCHER NO.	NET AMOUNT
						VOUCHER 296497	38000.00
TOTALS >		38000.00		0.00			38000.00

SOFTWARE HOUSE INTERNATIONAL, INC.

IMPRINT INC. (800) 856-6354, JC

THIS DOCUMENT CONTAINS ULTRAVIOLET FIBERS, CHEMICAL STAIN FEATURE, AND A TRUE WATERMARK ON THE BACK - HOLD UP TO LIGHT TO VIEW



SOFTWARE HOUSE INTERNATIONAL, INC.

2 RIVERVIEW DRIVE
SOMERSET, NEW JERSEY 08873
PHONE (732) 805-9160

WACHOVIA
Wilmington, DE 19803
62-22 / 311

230848

DATE 08/08/05 CHECK NO. 230848 AMOUNT *****\$38,000.00

THIRTY-EIGHT THOUSAND AND NO/100 Dollars

P C KRAUSE AND ASSOCIATES
1220 POTTER DR
HENTSCHEL CENTER, SUITE 130D
WEST LAFAYETTE, IN 47906 USA

PAY
TO THE
ORDER OF

VOID AFTER 120 DAYS

⑈230848⑈ ⑆031100225⑆2079950043816⑈



Purchase Order:

GE Global Research

SELLER: PC KRAUSE & ASSOCIATES INC
HENTSCHER CENTER
1220 POTTER DRIVE
WEST LAFAYETTE, IN 47906
United States

Phone: (765) 464-8997 Fax: (765) 464-1017

CUSTOMER ACCOUNT NO.	VENDOR NO. 928109	DATE OF ORDER / BUYER NAME 06-DEC-04 PRATICO, S	REVISED DATE / BUYER PHONE NUMBER 1 518 387-5590
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SHIPMENT TERMS 01 60	SHIP VIA FedEx 2Day #012200714	FOB Destination
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WEIGHT TERMS Collect	REQUESTOR / DELIVER TO KERN, JOHN M	VENDOR CONTACT / TELEPHONE Lucas, E (765) 464-8997
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ITEM	PART NUMBER / DESCRIPTION	DELIVERY DATE	QUANTITY	UNIT	UNIT PRICE	EXTENSION	TAX
Any questions regarding this Purchase Order should be directed to the Buyer and phone number listed above.							

INTEGRITY STATEMENT. If you as a Supplier become aware of any situation that appears to be inconsistent with GE's Policy to maintain lawful and fair practices in its' supplier relationships, you may write to our local GE Ombudsman as follows: GE Ombudsman, GE Global Research, One Research Circle, Niskayuna, NY 12309.							

as per quotes 112904-1 & 120604-1							
ALL ITEMS ON THIS PO MUST BE RECEIVED BY GE GLOBAL RESEARCH ON OR BEFORE 12/30/04							
1	Distributed Heterogeneous Simulation software for C running on Windows OS	30-DEC-04	2.00	Each	2000	4,000.00	N
		30-DEC-04	2.00	Each			N
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I						
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I						
2	Distributed Heterogeneous Simulation software for Simulink running on	30-DEC-04	2.00	Each	10000	20,000.00	N

ACCEPTANCE OF THIS ORDER CONSTITUTES YOUR CERTIFICATION THAT ALL MATERIAL IS IN CONFORMANCE WITH ALL USA REQUIREMENTS
DO NOT INSURE UNLESS SPECIFIED
INSTANTANEOUS PREPAID CHARGES INVOICED
SERIAL DELIVERY HOURS ARE 7:00 AM - 3:30 PM MON - FRI UNLESS OTHERWISE AUTHORIZED BY THE UNDERSIGNED.
NEW YORK STATE SALES AND USE TAX CERTIFICATE NO. 16-0338240C, IF APPLICABLE
NOTE: This order expressly limits acceptance to the terms stated on the face and back of this form and on any Purchase Order supplement attached hereto. Any additional or different terms, whether or not materially different, set forth in any communication from the seller are objected to and are hereby rejected.
24012-1

PURCHASE ORDER NO. A02 700106506	REVISION 0	PAGE 1
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THIS PURCHASE ORDER NO. MUST APPEAR ON ALL INVOICES, PACKING SLIPS, CARTONS AND CORRESPONDENCE RELATING TO THIS ORDER.

SHIP TO:

GE Global Research
One Research Circle
Receiving Building
Niskayuna, NY 12309
United States

BILL TO:

GE Global Research
Accounts Payable
PO Box 9531
Ft. Myers FL 33906-9531
United States

FOR PROMPT PAYMENT YOUR INVOICE MUST
REFLECT THIS PURCHASE ORDER

Total Continued

AUTHORIZED SIGNATURE
ADDRESS ALL CORRESPONDENCE TO ATTENTION OF
GE Global Research

Paul Krause
SUPPLIER SIGNATURE



Purchase Order

GE Global Research

PURCHASE ORDER NO.	REVISION	PAGE
A02 700106506	0	2

THIS PURCHASE ORDER NO. MUST APPEAR ON ALL INVOICES, PACKING SLIPS, CARTONS AND CORRESPONDENCE RELATING TO THIS ORDER.

SHIP TO:

GE Global Research
One Research Circle
Receiving Building
Niskayuna, NY 12309
United States

BILL TO:

GE Global Research
Accounts Payable
PO Box 9531
Ft. Myers FL 33906-9531
United States

SELLER: PC KRAUSE & ASSOCIATES INC.
HENTSCHEL CENTER
1220 POTTER DRIVE
WEST LAFAYETTE, IN 47906
United States

Phone: (765) 464-8997 Fax: (765) 464-1017

FOR PROMPT PAYMENT YOUR INVOICE MUST
REFLECT THIS PURCHASE ORDER

CUSTOMER ACCOUNT NO.	VENDOR NO.	DATE OF ORDER / BUYER NAME	REVISED DATE / BUYER PHONE NUMBER
	928109	06-DEC-04 PRATICO, S	1 518 387-5590
PAYMENT TERMS	SHIP VIA	FOB.	
01 60	FedEx 2Day #012200714	Destination	
WEIGHT TERMS	REQUESTOR / DELIVER TO	VENDOR CONTACT / TELEPHONE	
Collect	KERN, JOHN M	Lucas, E (765) 464-8997	

ITEM	PART NUMBER / DESCRIPTION	DELIVERY DATE	QUANTITY	UNIT	UNIT PRICE	EXTENSION	TAX
	Windows OS	30-DEC-04	2.00	Each			N
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I						
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I						
3	Distributed Heterogenous Simulation software for Fortran running on Windows OS	30-DEC-04	2.00	Each	2000	4,000.00	N
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I	30-DEC-04	2.00	Each			N
	DELIVER TO: KERN, JOHN M (1.00) EP-111-I						

Total 28,000.00

AUTHORIZED SIGNATURE
ADDRESS ALL CORRESPONDENCE TO ATTENTION OF
GE Global Research

SUPPLIER SIGNATURE

ACCEPTANCE OF THIS ORDER CONSTITUTES YOUR CERTIFICATION THAT ALL MATERIAL IS IN CONFORMANCE WITH ALL OSHA REQUIREMENTS

7 MONTHS UNLESS SPECIFIED

25% DATE PREPAID CHARGES INVOICED

ATERIAL DELIVERY HOURS ARE 7:00 A.M. - 5:30 P.M. MON - FRI, UNLESS OTHERWISE AUTHORIZED BY THE UNDERSIGNED

NY YORK STATE SALES AND USE TAX CERTIFICATE NO. 14-01883400, IF APPLICABLE

NOTE: This order expressly limits acceptance to the terms stated on the face and back of this form and on any Purchase Order supplement attached hereto. Any additional or different terms, whether or not materially different, set forth in any communication to the seller are objected to and are hereby rejected.

24012.1



Purchase Order:

GE Global Research

PURCHASE ORDER NO.	REVISION	PAGE
A02 700107716	1	1

THIS PURCHASE ORDER NO. MUST APPEAR ON ALL INVOICES, PACKING LISTS, CARTONS AND CORRESPONDENCE RELATING TO THIS ORDER.

SHIP TO:

GE Global Research
One Research Circle
Receiving Building
Niskayuna, NY 12309
United States

BILL TO:

GE Global Research
Accounts Payable
PO Box 9531
Ft. Myers FL 33906-9531
United States

SELLER: PC KRAUSE & ASSOCIATES INC
HENTSCHEL CENTER
1220 POTTER DRIVE
WEST LAFAYETTE, IN 47906
United States

Phone: (765) 464-8997 Fax: (518)387-5716

FOR PROMPT PAYMENT YOUR INVOICE MUST MIRROR THIS PURCHASE ORDER

CUSTOMER ACCOUNT NO.	VENDOR NO.	DATE OF ORDER / BUYER NAME	REVISED DATE / BUYER PHONE NUMBER
	928109	12-JAN-05 APPIO, J	25-JAN-05 518-387-6489
PAYMENT TERMS	SHIP VIA	F.O.B.	
01 60	FedEx 2Day #012200714	Destination	
FREIGHT TERMS	REQUESTOR / DELIVER TO	VENDOR CONTACT / TELEPHONE	
Collect	KERN, JOHN M	Lucas, E (765) 464-8997	

ITEM	PART NUMBER / DESCRIPTION	DELIVERY DATE	QUANTITY	UNIT	UNIT PRICE	EXTENSION	TAX
Any questions regarding this Purchase Order should be directed to the Buyer and phone number listed above.							

INTEGRITY STATEMENT. If you as a Supplier become aware of any situation that appears to be inconsistent with GE's Policy to maintain lawful and fair practices in its' supplier relationships, you may write to our local GE Ombudsman as follows: GE Ombudsman, GE Global Research, One Research Circle, Niskayuna, NY 12309.							

1	Attn: Eric- Quote 112904-2. Be sure to reference the PO on all items shipped. Questions, 518-387-6489	12-MAR-05	2.00	Each	2000	4,000.00	N
	Distributed Heterogeneous Simulation software for Saber running on Windows Operating System	12-MAR-05	2.00	Each			N
DELIVER TO: KERN, JOHN M (2.00) EP-111-I							

ACCEPTANCE OF THIS ORDER CONSTITUTES YOUR CERTIFICATION THAT ALL MATERIAL IS IN CONFORMANCE WITH ALL OSHA REQUIREMENTS.

DO NOT INSURE UNLESS SPECIFIED.

SUBSTANTIATE PREPAID CHARGES INVOICED

MATERIAL DELIVERY HOURS ARE 7 00 A.M. - 3:30 P.M. MON. - FRI. UNLESS OTHERWISE AUTHORIZED BY THE UNDERSIGNED.

NEW YORK STATE SALES AND USE TAX CERTIFICATE NO. 14-0689340C, IF APPLICABLE.

NOTE: This order expressly limits acceptance to the terms stated on the face and back of this form and on any Purchase Order supplement attached hereto. Any additional or different terms, whether or not materially different, set forth in any communication from the seller are objected to and are hereby rejected.

RD4014-1

Total 4,000.00

AUTHORIZED SIGNATURE
ADDRESS ALL CORRESPONDENCE TO ATTENTION OF:
GE Global Research

SUPPLIER SIGNATURE